

REMARKS

Entry of this Amendment and reconsideration of the subject application in view thereof are respectfully requested.

As a preliminary matter, the Examiner appears to have examined the claims in the PCT application as original filed as opposed to the Article 34 amendments. In order to remove any doubt, Applicant has relisted the claims in the Article 34 amendments in compliance with 37 CFR 1.121.

I. Claim Status

Claims 1-23 are pending in the application and have been rejected. Claims 1, 7 and 14 have been amended to clarify the invention. Support for the amendments to claims 1, 7 and 14 can be found in the specification, for example, at page 27, line 23 through page 28, line 4 of the English language translation of the application that is of record. Claims 3, 9 and 16 have been canceled. No new matter is added.

II. Response to Non-final Office Action of May 13, 2009

Applicant respectfully believes that the claim rejections made in the Office Action of May 13, 2009 (herein referred to as "the Office Action" or "this Office Action" or "the present Office Action") have been overcome in view of the following discussion:

A. Rejection of Claims under 35 U.S.C. § 102

Claims 1, 4, 7, 10, 13, 14 and 17 are rejected under 35 U.S.C. § 102(b) as being anticipated by Olry et al. (US 6,051,313) ("Olry"). Applicant respectfully traverses the rejection.

Of the rejected claims, claims 1, 7 and 14 are independent claims. The remaining claims depend, either directly or indirectly, from the respective independent claims. Claim 1 is directed to an isotropic pitch-based carbon fiber spun yarn fabric produced by a process. Claim 7 is directed to a method of manufacturing an isotropic pitch-based carbon fiber spun yarn fabric. Claim 14 is directed to a composite yarn requiring, among other things, an isotropic pitch-based carbon fiber spun yarn and a water-soluble polymer fiber wound around a surface of the spun yarn.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Schering Corporation v. Geneva Pharmaceuticals, Inc.*, 339 F.3d 1373 (Fed. Cir. 2003). Identity of invention requires that a prior reference disclose to one of ordinary skill in the art all elements and limitations of the patent claim. *Scripps Clinic v. Genentech*, 927 F.2d 1565, 1576 (Fed. Cir. 1991). Absence from the reference of

any claimed element negates anticipation. *Kloster Speedsteel AB v. Crucible, Inc.*, 230 USPQ 81 (Fed. Cir. 1986). Inherent anticipation requires that the missing descriptive material is “necessarily present,” not merely, probably or possibly present in the prior art reference. *In re Robertson*, 169 F.3d 743 (Fed. Cir. 1999).

In rejecting the claims based on the Olry references, the Examiner contends that:

“Olry et al. discloses a yarn is formed from discontinuous parallel fibers which are not twisted and which are held together by a covering yarn of sacrificial material wound around the fibers. Olry et al. discloses the hybrid yarn can be formed from carbon fibers and optionally from ceramic fibers or with carbon precursor fibers and optionally with ceramic precursor fibers. In the later case, the fibers can be those obtained by spinning the initial precursor or it can be in a state intermediate between the initial state and the carbon or ceramic state. Such an intermediate state may be a pre-oxidized state or a semi-carbonized state or a semi-ceramic state.” (Office Action at 2)

The isotropic pitch-based carbon fiber spun yarn fabric recited in claim 1 in the product-by-process claim format is not the same as or obvious from Olry’s yarn formed from discontinuous parallel fibers which are not twisted and which are held together by a covering yarn of sacrificial material wound around the fibers. Applicant’s does not have to rely on the product-by-process doctrine to show that Olry does not anticipate the rejected claims. More specifically, the rejected claims require carbon fiber spun yarn. The spun yarn is inherently twisted. Whereas Olry discloses a yarn in which the carbon fibers remain parallel to each other and not twisted. See Olry, for example, at column 5, lines 41-42 and lines 50-51. Thus, “the article of the applied prior art (the yarn of Olry) is not and cannot be identical to the claimed article. The claimed article is significantly different from the prior art article.

With regard to the product-by-process limitations, Applicant notes that in general, the patentability of a product does not depend on its method of production (*In re Thorpe*, 777 F.2d 695 (Fed. Cir. 1985)). There are exceptions to this general rule. Specifically, as applied to the facts of the instant case, the structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made. *AFG Industries Inc. v. Cardinal IG Company*, 375 F.3d 1367 (Fed. Cir. 2004). See also MPEP § 2113. Olry does not disclose either explicitly or implicitly the claimed

isotropic pitch-based carbon fiber spun yarn fabric with features including the composite yarn and the composite yarn fabric implied by the process steps.

The manufacturing process steps of winding a water-soluble polymer fiber around a surface of an isotropic pitch-based carbon fiber spun yarn to form a composite yarn; weaving the composite yarn to form a composite yarn fabric; and dissolving and removing the water-soluble polymer fiber from the composite yarn fabric” including the limitations in the wherein clauses imply a distinct structure to the claimed carbon fiber spun yarn fabric, which can only be defined by the process steps.

By employing these specific process steps, it is possible to provide the isotropic pitch-based carbon fiber spun yarn fabric, the fabric being capable of high-speed weaving while sufficiently preventing occurrence of thread breakage at the time of high-speed weaving and also capable of improving a work environment while preventing generation of dust at the time of manufacturing (see the present specification, page 4, lines 4 to 13). Moreover, it is possible to obtain the composite yarn which is provided with sufficiently high tensile strength thereof and is easier to handle without requiring corrections in particular. At the same time, there is a tendency that generation of dust out of the isotropic pitch-based carbon fibers is apt to be prevented more reliably as the contacts of the composite yarn with guides, rollers, and the like of a loom are considerably reduced (see the present specification, page 27, line 22 to page 28, line 20). Winding the water-soluble polymer fiber around the surface of the spun yarn to form a composite yarn allows for an improved binding force between the fibers, while retaining flexibility of the fibers. Using the composite yarn thus formed, it is possible to perform weaving without causing thread breakage at the time of high-speed weaving or incurring emergency shutdown of a high-speed loom. In addition, it is possible to prevent generation of dust sufficiently at the time of weaving (see the present specification, page 25, line 25 to page 26 line 11).

On the other hand, Olry discloses a yarn formed from discontinuous parallel fibers which are held together by a covering yarn of sacrificial material wound around the fibers. However, Olry does not disclose a composite yarn formed by winding a first water-soluble polymer fiber around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers, and winding a second water-soluble polymer fiber around the surface of the spun yarn by twisting the second water-

soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers. There is no evidence that the covering yarn comprises a first and second water-soluble polymers twisted in first and second directions, respectively.

Anticipation cannot rest on probability and possibilities or mere speculation that “Olry discloses a substantially similar final fabric proudct.” The carbon fiber yarn or the “hybrid yarn,” wherein the carbon fibers are not twisted, as admitted by the Examiner, is neither expressly nor inherently the same as the product in Applicant’s invention. The “sacrificial material which constitutes the covering yarn” is neither expressly nor inherently the same as the composite yarn formed by winding a first water-soluble polymer fiber around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers, and winding a second water-soluble polymer fiber around the surface of the spun yarn by twisting the second water-soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers. Olry fails to teach the isotropic pitch-based carbon fiber spun yarn and the composite yarn. Thus, Olry fails to teach each and every limitation of claim 1, either expressly or inherently, which teaching is required for the reference to anticipate the claimed invention.

With regard to Claim 7, which is a process claim, Olry does not teach or disclose, either expressly or implicitly, the claimed process involving (i) obtaining composite yarn by winding a water-soluble polymer fiber around a surface of isotropic pitch-based carbon fiber spun yarn, which includes winding a first water-soluble polymer fiber around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers, and winding a second water-soluble polymer fiber around the surface of the spun yarn by twisting the second water-soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers; (ii) obtaining a composite yarn fabric by weaving the composite yarn; and (iii) obtaining the isotropic pitch-based carbon fiber spun yarn fabric by dissolving and removing the water-soluble polymer fiber from the composite yarn fabric. Without acquiescing to the Examiner’s contention that the term “sacrificial matererial” constitutes the covering yarn, Applicant respectfully submits that the assertions made at pages 5 and 6 of the Office Action does not establish Olry anticipates claim 7. For example, the assertion that “winding the mixed discontinuous fibers with a covering yarn of sacrificial matererial to ensure the integrity of the

hybrid yarn obtained” does not necessarily teach any of the claimed steps including the step of obtaining composite yarn by winding a water-soluble polymer fiber around a surface of isotropic pitch-based carbon fiber spun yarn. Thus, Olry fails to teach each and every limitation of claim 7, either expressly or inherently, which teaching is required for the reference to anticipate the claimed invention.

With regard to Claim 14, which is a product claim, Olry does not teach or disclose a composite yarn containing an isotropic pitch-based carbon fiber spun yarn; and a water-soluble polymer fiber wound around a surface of the spun yarn. Olry does not teach or disclose the water-soluble polymer fiber must contain a first water-soluble polymer fiber wound around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers and a second water-soluble polymer fiber wound around the surface of the spun yarn by twisting the second water-soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers. Thus, Olry fails to teach each and every limitation of claim 7, either expressly or inherently, which teaching is required for the reference to anticipate the claimed invention.

In addition to disclosing to one of ordinary skill in the art all elements and limitations of a claimed invention, the cited reference must also enable the skilled artisan to make and use the claimed invention. In order to arrive at the invention claimed in patent claims 1, 7 and 14, the present inventors focused on specific features such as forming composite yarn by winding the water-soluble polymer fiber around the surface of the spun yarn, winding a first water-soluble polymer fiber around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers, and winding a second water-soluble polymer fiber around the surface of the spun yarn by twisting the second water-soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers based on actual working examples and found that forming a composite yarn is critical to arrive at the claimed isotropic pitch-based carbon fiber spun yarn fabric. This sort of enabling information is absent in Olry.

It is Examiner’s burden to show that each and every element is “necessarily present,” not merely or possibly present in the Olry reference. As such, given the strict identity required of the test for novelty, the Examiner has not established a *prima facie* case of anticipation in support of the rejection of claims 1, 7 and 14 based on the Olry reference. Therefore, Olry does not

anticipate claims 1, 7 and 14 as it does not teach or disclose each and every limitation in these claims. The rejected dependent claims 2, 4, 10, 13, 15 and 17 are similarly considered by Applicant to patentably define themselves over the Olry reference by virtue of their dependency from the respective independent claims.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 102 (b) are respectfully requested.

B. Rejection of Claims under 35 U.S.C. § 103

The Examiner has rejected Claims 2, 5, 6, 8, 11, 12, 15, 18-23 under 35 U.S.C. § 103(a) as being unpatentable over Olry et al. (US 6,051,313) (“Olry”) in view of Kitamura et al. (US 5,030,435) (“Kitamura”) and Hattori et al. (US 4,552,329) (“Hattori”). The Examiner has rejected Claims 3, 9 and 16 under 35 U.S.C. § 103(a) as being unpatentable over Olry in view of Bompard et al. (US 6,585,842) (“Bompard”), and also as being unpatentable over Olry in view of Chiu et al. (US 6,800,364) (“Chiu”) and Bompard. The Examiner has rejected Claims 1, 2, 4, 7, 10, 13, 14, 15, and 17 under 35 U.S.C. § 103(a) as being unpatentable over Olry in view of Chiu et al. The Examiner has rejected Claims 2, 5, 6, 8, 11, 12, 15, 18-23 under 35 U.S.C. § 103(a) as being unpatentable over Olry in view of Chiu et al., as applied to claim 1 and further in view of Kitamura et al. (US 5,030,435) (“Kitamura”) and Hattori et al. (US 4,552,329) (“Hattori”). Applicant respectfully traverses the Examiner’s rejections.

To establish a *prima facie* case of obviousness the prior art reference (or references when combined) must teach or suggest all of the claim limitations. MPEP §2142; *Velander v. Garner*, 348 F.3d 1359, 1363 (Fed. Cir. 2003). The *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1 (1966), factors control an obviousness inquiry. Those factors are: 1) "the scope and content of the prior art"; 2) the "differences between the prior art and the claims"; 3) "the level of ordinary skill in the pertinent art"; and 4) objective evidence of nonobviousness. *KSR International Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007) (quoting *Graham*, 383 U.S. at 17-18). “A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). A prior art reference teaches away when “a person of ordinary skill in the art, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 27 F.3d 551 (Fed. Cir.

1994); *Cf. Baxter International, Inc. v. McGraw, Inc.*, 149 F.3d 1321 (Fed. Cir. 1998).

1. Olry, Kitamura and Hattori

Olry is discussed above. Olry does not teach or suggest the claimed isotropic pitch-based carbon fiber spun yarn fabric. O As explained above, the Examiner does not articulate how any of the prior art references cited would necessarily have the features found in Applicant's invention, namely the ability to perform weaving without causing thread breakage at the time of high-speed weaving, incurring emergency shutdown of a high-speed loom, and preventing generation of dust sufficiently at the time of weaving.

Olry is discussed above in connection with the anticipation rejection. Olry discloses a yarn formed from discontinuous parallel fibers which are not twisted and which are held together by a covering yarn of sacrificial material wound around the fibers. Olry does not teach or suggest the claimed isotropic pitch-based carbon fiber spun yarn fabric. The Examiner has not explained why, in view of the Olry's teachings, it would have been obvious to use an isotropic pitch-based carbon fiber spun yarn notwithstanding the explicit disclosures in Olry that a yarn be used in which the carbon fibers remain parallel to each other and not twisted. The Examiner has not explained why, in view of the Olry's teachings, it would have been obvious to form the specific composite yarn fabric.

Kitamura discloses a process for producing a chopped strand by using a petroleum pitch or coal pitch as a starting material, coating the pitch fiber with a sizing agent, but Kitamura does not remedy the deficiencies in Olry. Kitamura does not teach or suggest the claimed fabric made of isotropic pitch-based carbon fiber spun yarn. Further, Kitamura does not teach or suggest a composite yarn formed by winding a first water-soluble polymer fiber around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers, and winding a second water-soluble polymer fiber around the surface of the spun yarn by twisting the second water-soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers.

Hattori discloses carbon fibers made from polyacrylonitrile and pitches comprising a sizing agent, but Hattori does not teach or suggest the claimed fabric made of isotropic pitch-based carbon fiber spun yarn. Further, Kitamura does not teach or suggest a composite yarn formed by winding a first water-soluble polymer fiber around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers, and winding a second water-soluble polymer fiber around the surface of the spun yarn by twisting the second

water-soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers.

Obviousness cannot be based on mere conclusory statements. The combination of Olry, Kitamura and Hattori does not render the invention set forth in claims 2, 5, 6, 8, 11, 12, 15 and 18-23 because each of these claims recite novel and nonobvious features either by themselves or by virtue of their dependency from their respective independent claims. There is no reasonable expectation of success in arriving at the invention set forth in these claims based on the combined teachings of Olry, Kitamura and Hattori. If anything, the Olry reference teaches away from the claimed isotropic pitch-based carbon fiber spun yarn fabric by its explicit and contrary teaching that a yarn be used in which the carbon fibers remain parallel to each other and not twisted. Accordingly, reconsideration and withdrawal of the rejection based on the combination of Olry, Kitamura and Hattori are respectfully requested.

2. Olry and Bompard

The Examiner has applied the Olry and Bompard prior art combination against claims 3, 9 and 16. However, because these claims have been canceled, the rejection based on Olry and Bompard is moot. Reconsideration is respectfully requested.

3. Olry and Chiu

Olry is discussed above. Chiu discloses a method of forming a thermal insulation material using isotropic pitch carbon fibers. However, Chi does not disclose the water-soluble polymer fiber starting material in Applicant's invention. However, Chiu does not teach or suggest the claimed fabric made of isotropic pitch-based carbon fiber spun yarn. Further, Chiu does not teach or suggest a composite yarn formed by winding a first water-soluble polymer fiber around the surface of the spun yarn by twisting the first water-soluble polymer fiber in a first direction with gaps provided between the fibers, and winding a second water-soluble polymer fiber around the surface of the spun yarn by twisting the second water-soluble polymer fiber in a second direction opposite to the first direction with gaps provided between the fibers.

The combination of Olry and Chiu does not render the invention set forth in claims 1, 2, 4, 7, 10, 13, 14, 15, and 17 because each of these claims recite novel and nonobvious features either by themselves or by virtue of their dependency from their respective independent claims. There is no reasonable expectation of success in arriving at the invention set forth in these claims based on the combined teachings of Olry and Chiu. If anything, the Olry reference teaches away from the

claimed isotropic pitch-based carbon fiber spun yarn fabric by its explicit and contrary teaching that a yarn be used in which the carbon fibers remain parallel to each other and not twisted.

Accordingly, reconsideration and withdrawal of the rejection based on the combination of Olry, Chiu are respectfully requested.

4. Olry, Chiu, Kitamura and Hattori

Olry and Chiu are discussed above in connection with the rejection of claims 1, 2, 4, 7, 10, 13, 14, 15, and 17 and nonobviousness of these claims over this particular combination of references. Olry, Kitamura and Hattori are discussed above in connection with the rejection of claims 2, 5, 6, 8, 11, 12, 15, 18-23 and nonobviousness of these claims over the cited combination. Chiu discloses a method of forming a thermal insulation material using isotropic pitch carbon fibers. Chiu does not cure the deficiencies in Olry, Kitamura and Hattori sufficient to render the rejected claims obvious. If anything, the Olry reference teaches away from the claimed isotropic pitch-based carbon fiber spun yarn fabric by its explicit and contrary teaching that a yarn be used in which the carbon fibers remain parallel to each other and not twisted. Accordingly, reconsideration and withdrawal of the rejection based on the combination of Olry, Chiu, Kitamura, Hattori and Chiu are respectfully requested.

5. Olry, Chiu and Bompard

The Examiner has applied the Olry, Chiu and Bompard combination against claims 3, 9 and 16. However, because these claims have been canceled, the rejection based on Olry and Bompard is moot. Reconsideration is respectfully requested.

III. Conclusion

Applicant believes this response to be a full and complete response to the Office Action. Accordingly, favorable reconsideration in view of this response and allowance of all of the pending claims are earnestly solicited.

If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Date: September 13, 2009

Respectfully submitted,

REED SMITH LLP

A handwritten signature in black ink, appearing to read 'Nanda P.B.A. Kumar', is written over a horizontal line.

Nanda P.B.A. Kumar
Registration No. 44,853
2500 One Liberty Place
1650 Market Street
Philadelphia, PA 19103-7301
(215) 851-8100
Attorney for Applicant